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RefugeUpdate (USFWS-NWRS)

US Fish & Wildlife Service

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Refuge Update – March/April 2007, Volume 4, Number 2

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U.S. Fish & Wildlife Service
National Wildlife Refuge System

RefugeUpdate

March/April 2007 Vol 4, No 2

Inside

First Lady Tours Midway Atoll Refuge

First Lady Laura Bush, pictured with Wildlife Biologist John Klavitter, planted native bunchgrass during a March 1 tour of Midway Atoll National Wildlife Refuge. Mrs. Bush announced Papahanaumokuakea as the name for the Northwest Hawaiian Islands National Monument, which overlays Midway Atoll and Hawaiian Islands Refuges. The name suggests "the abundance and timelessness of life in the Islands," said Mrs. Bush. *(Shealah Craighead)*

Where the Buffalo Roam

The U.S. Fish and Wildlife Service is using a new genetics-based approach to manage herds of bison. As part of the new approach, more than 100 animals are being moved around National Wildlife Refuge System lands in five states. (USFWS)

The U.S. Fish and Wildlife Service is changing the way it manages an icon of the American west – the bison. "Instead of managing individual herds, we are moving to manage the Service's herds as one resource," says Paul Halko, refuge manager at Sullys Hill National Game Preserve in North Dakota.

More than 100 bison are being moved around five states to mark the beginning of a genetics-based approach to bison herd management. The goal is to maintain and create herds in the Refuge System that have no detectable cattle hybridization whenever possible. The transfers also insure against a catastrophic loss of key genetic material.

Early in December 2006, 39 bison from the Sullys Hill herd were moved to Fort Niobrara National Wildlife Refuge in Nebraska. A week later, seven animals were moved from the National Bison Range in Montana to Sullys Hill. Thirty-nine bison were also moved from the National Bison Range to Neal Smith National Wildlife Refuge in Iowa.

The small but genetically important Sullys Hill herd was moved to Fort Niobrara Refuge, where there is more room for the herd to expand to a population of 500. Sullys Hill National Game Preserve will now nurture a smaller herd from the new animals. The herds coming to Sullys Hill

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H. Dale Hall

From the Director
Celebrating a Legacy

Greatness endures. So as we celebrate the centennial of Rachel Carson's birth this year, we not only remember her pivotal role in showing us what toxins can do to our wildlife and our way of life but also reflect on her genuine respect for and love of nature.

We are certainly proud Carson began her legacy of environmental education and research within the ranks of the Service. She served as editor-in-chief of all Service publications; is widely heralded for creating the *Conservation in Action* series; and was devoted to helping Americans understand the diversity of wildlife and species found on national wildlife refuges.

During this Rachel Carson centennial year, the Service will use her legacy as an example to help Americans understand how they can make a real difference in the conservation of our natural resources. Much of that already takes place on national wildlife refuges, whose staffs, Friends groups and volunteers last year worked with more than 50,000 teachers and 774,000 students in environmental education programs.

Carson's environmental conscience began long before she launched her career. Born in rural Pennsylvania, her youngest years were spent exploring the forests and streams around her farm home. Even in grade school, she was fascinated and passionate about nature and writing. She was first "published" at age 10.

How much did her early childhood connection to the outdoors influence her? A great deal, I would suggest. We are the beneficiaries of her years spent finding miracles in nature. So while we celebrate her lifetime as a scientist and her major influence on our nation's conservation ethic through the book *Silent Spring* and her other writings, we must also acknowledge what we teach our children will be passed on to their children, and so on.

National wildlife refuges are ideal "classrooms" for the kind of learning Rachel Carson exemplified and promoted. Of the Refuge System's Blue Goose symbol, she wrote, "Whenever you meet this sign, respect it. It means that the land behind the sign has been dedicated by the American people to preserving, for themselves and their children, as much of our native wildlife as can be retained along with modern civilization."

I remember those words every time I visit a national wildlife refuge, and every time I see a child overjoyed by the wonder of nature. We all should remember every youngster we welcome at a national wildlife refuge could become the Rachel Carson of tomorrow. ◆

Geoff Haskett

Chief's Corner
Important People in Our Corner

National wildlife refuges have a new group of friends in the nation's capital: the bipartisan Congressional Wildlife Refuge Caucus. So far, about 120 members of the House of Representatives have joined the Caucus, representing 36 states and 168 refuges. Caucus Co-Chairs Reps. Ron Kind of Wisconsin and Jim Saxton of New Jersey have long been friends of the Refuge System, as have Caucus Vice Chairs Reps. Michael Castle of Delaware and Mike Thompson of California.

Right from the start, the Caucus identified five major goals:

- Increase awareness of the National Wildlife Refuge System;
- Create a voice for refuges in Congress;
- Support adequate budgets for the Refuge System;
- Encourage the growth of the System; and
- Support wildlife-dependent recreation that takes place on national wildlife refuges.

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RefugeUpdate

Dirk Kempthorne
Secretary
Department of the Interior

H. Dale Hall
Director – U.S. Fish and Wildlife Service

Geoffrey L. Haskett
Assistant Director – National Wildlife Refuge System

Martha Nudel
Editor in Chief

Karen Leggett
Managing Editor

Address editorial inquiries to:
Refuge Update
USFWS-NWRS
4401 North Fairfax Dr., Room 634C
Arlington, VA 22203-1610
Phone: 703-358-1858
Fax: 703-358-2517
E-mail: RefugeUpdate@fws.gov

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What's Melting: Togiak Refuge Sizes Up Its Glaciers

by Michael Wright

Almost everywhere on Planet Earth, it seems, glaciers are melting. Togiak National Wildlife Refuge — whose 4.3 million acres include many of Southwestern Alaska's only remaining glaciers — has now joined the international search for explanations.

The refuge has launched a long-term effort to measure changes in the size of several dozen glaciers. These particular glaciers are especially sensitive to warming trends, scientists say, because of their relatively compact structure.

Refuge Manager Paul Liedberg and Supervisory Biologist Pat Walsh are compiling a detailed photographic record of the glaciers. Patches of the ancient ice are scattered around 200 square miles of the Ahklun Mountains, which sprawl over nearly 80 percent of the refuge and extend well into neighboring Wood-Tikchik State Park.

Togiak Refuge has a high-powered partner — Northern Arizona University (NAU), one of five campus-based regional centers affiliated with the National Institute for Climatic Change Research. The research is sponsored by a unit of the Department of Energy. The state park, where many of the glaciers are located, is also a partner.

At various times in recent years, NAU scientists have, in addition to other earth science projects, drilled into dry lakebeds, whose sediment can provide evidence of the temperature swings of long-ago climates. Global warming researchers from other universities — among them the University of Illinois and Mount Holyoke College — have also roamed through the mountains.

"For some time, we've suspected that the glaciers were receding," Walsh said. "And now we can confirm this." NAU Geology Professor Darrell Kaufman, a prominent figure in the global warming research community, was among those who pressed the need for giving the glaciers special attention. Kaufman, who makes frequent visits to Togiak Refuge, is in charge of a far-flung research team — sponsored by the Arctic System Science Program of the National Science Foundation — that is looking for clues to the causes and consequences of climate changes in the geological records of Alaska, Canada, Iceland and Greenland.

Togiak National Wildlife Refuge has launched a study of several dozen glaciers especially sensitive to warming trends because of their relatively compact structure. The study includes the first detailed photographic record since 1979 of the glaciers, scattered around 200 square miles of the Ahklun Mountains. (USFWS)

First Count Since 1979

At the research's onset, no one was exactly sure of how many glaciers were out there; the Ahkluns had not been charted in any detail since 1979. That year, the U.S. Geological Survey (USGS), consulting six-year-old aerial photographs, drew topographical maps of the region. Scanning their handiwork, the USGC map-makers identified 116 glaciers.

To help Liedberg and Walsh find their way, the USGC maps were digitized and a copy downloaded into Walsh's laptop. Finally, late last summer, the two men climbed into a two-seater Piper Super Cub, and the glacier-count was under way. Liedberg, an experienced pilot, did the flying; Walsh took highly detailed low-level pictures and, with his laptop up and running, navigated.

Before cold weather and dense clouds set in, they found 97 of the original 116 glaciers identified by the USGS, which is not involved in the re-survey, and determined that 12 had disappeared. Several glaciers appeared to be fragments of once far-larger ice masses. "It's clear that many glaciers are much smaller than they once were," Walsh said. "And we saw several exposed depressions in the mountains that were once filled with ice." They also discovered two glaciers that apparently had been previously overlooked.

This year, after the return of warm weather, Liedberg and Walsh plan to search for the seven other glaciers previously mapped by USGS. A state park air crew will join the hunt and provide other support, Liedberg said.

He and Walsh said their 2007 goals also include more sharply defining the existing boundaries of the Togiak glaciers. Ground crews will establish photo monitoring stations, that will be periodically revisited in the future.

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Friends Academy: Advanced Capacity-Building

The first-ever Friends Academy, designed to build the capability of Refuge Friends organizations to advance the Refuge System's mission of wildlife conservation, will debut July 22-27. Thirty Friends from 30 organizations will be invited to the advanced training, which will be held on the NCTC campus during the same week as the Advanced Refuge Academy. Participants at both academies can meet at meals, breaks and in the evenings.

The concept of a Friends Academy won special support in the wake of regional Friends workshops that brought together hundreds of Refuge Friends. The workshops enabled participants to explore ways to plan projects over several years, using the Refuge System's 12 strategic goals. During the regional workshops, many individuals expressed a strong desire to learn more about how they can contribute nationally to conserving natural resources.

The Friends Academy will give Refuge Friends the basic tools for leadership:

- A thorough understanding of the programs, policies and legal mandates that form the foundation of the Refuge System.
- A chance not only to meet career refuge employees who are attending the Advanced Refuge Academy, but also to learn about the Refuge System's multitude of issues and challenges.
- A forum to develop and foster a professional communication network of Friends.

During the week-long Academy, participants will gain a better understanding of the implications of pending national conservation challenges, including climate change and large-scale decimation by invasive plants. "Ultimately, we will further fortify the strength of the Friends movement," said Refuge System Chief Geoff Haskett.

Addressing Conservation Challenges

The regional workshops, held last year, were the first chance for many Friends members to move from concentrating on such critical but traditional basic issues as managing a nonprofit organization to addressing conservation challenges. "Those who attended the regional workshops will have a broad context in which to strategize solutions to national conservation challenges," said Haskett. "We know that Friends grow from the opportunity to share intellectual, creative and practical resources, and that they are seeking workshops and courses where learning is the focus and strategic planning is the path to results."

Under the tutelage of seasoned refuge managers and expert scientists, Friends at the Academy will explore strategies that local communities can use to address conservation threats. The National Wildlife Refuge Association will join the Refuge System in developing courses and activities.

"The big bonus is that refuge managers in the Advanced Refuge Academy will be on campus, too," said Liz Bellatoni, U.S. Fish and Wildlife Service planning coordinator. "As future leaders of the Refuge System have the chance to exchange ideas with the leaders of the Friends movement, they set a course for the conservation initiatives of tomorrow."

For more information, contact National Friends Coordinator Trevor Needham at 703-358-2392. ◆

The doors of a new capacity-building seminar will open in July, when the first-ever Friends Academy debuts on the campus of the National Conservation Training Center in West Virginia. Participants will learn about ways they can contribute locally to advancing the Refuge System's conservation mission and goals. (USFWS)

And the Winners Are…

Don Hultman, refuge manager for the Upper Mississippi River National Wildlife and Fish Refuge, has been named Paul Kroegel Refuge Manager of the Year. The refuge's Comprehensive Conservation Plan, the result of 46 public meetings attended by 4,500 people, was an award winner in its own right. (USFWS)

At Noxubee National Wildlife Refuge in Mississippi, Marion Sansing has been named Volunteer of the Year. Serving as the refuge's outdoor recreation planner, she partnered with Mississippi State University to develop a native plant garden and hosted "Women in the Outdoors" with the National Wild Turkey Federation to give women a chance to learn outdoor skills from expert instructors. (Hiroko Clay)

Bill Giese, fire control officer at Blackwater National Wildlife Refuge in Maryland, has spent 34 years with the U.S. Fish and Wildlife Service, working as a biologist, law enforcement officer and equipment operator. He was named Employee of the Year for, among other accomplishments, helping to protect the Little Blackwater River from major development proposals. (USFWS)

A diverse group of exceptional volunteers and employees has been honored by the National Wildlife Refuge Association and the National Fish and Wildlife Foundation. The annual awards recognize exceptional contributions toward protecting the National Wildlife Refuge System.

Don Hultman, refuge manager for the Upper Mississippi River National Wildlife and Fish Refuge, has been named Paul Kroegel Refuge Manager of the Year. Hultman manages 11 refuges along 261 miles of the Upper Mississippi River. Described as a passionate communicator and talented leader, Hultman led a Comprehensive Conservation Plan process that included 46 public meetings attended by 4,500 people.

A local newspaper article at the time wrote that "the quiet, thoughtful Hultman has earned the respect of an anxious public, even among many who don't support the proposed changes." The resulting plan approved in August 2006 ultimately won its own award. Hultman has also been involved in the Environmental Management program and he wrote the recently published Service Manual Policy Chapter on Refuge Mission, Goals and Purposes.

The Employee of the Year is **William Giese**, fire control officer at Blackwater National Wildlife Refuge in Maryland. Giese used his considerable knowledge, expertise and 34 years of experience to help protect the Little Blackwater River and the refuge from major development proposals. Giese works as a biologist, law enforcement officer and equipment operator. He developed partnerships with the Chesapeake Bay Foundation and Maryland Nutria Project, both of which were instrumental in eliminating the invasive nutria from Blackwater Refuge.

At Noxubee National Wildlife Refuge in Mississippi, **Marion Sansing** has been named Volunteer of the Year. She serves as spokesperson for the Friends of Noxubee and also outdoor recreation planner at the refuge, where her husband is the manager. She partnered with Mississippi State University to develop a native plant garden, used print, radio and even billboard advertising to attract volunteers and visitors to Noxubee Refuge, started an annual photography contest and partnered with the National Wild Turkey Federation to host "Women in the Outdoors," an opportunity for women to learn outdoor skills from expert instructors.

At San Luis Valley National Wildlife Refuge Complex in Colorado, Refuge Manager Michael Blenden nominated the winner of this year's Friends Group Award, the **Friends of San Luis Valley Refuge.** Blenden believes their work is particularly noteworthy because the group is small and operates a in a rural, "not particularly wealthy" community. Back in 2000, the group raised funds to build an observation trail at Monte Vista National Wildlife Refuge, giving the public its first chance to observe wildlife from outside their cars. The Friends developed the annual Kids Crane Festival for National Wildlife Refuge Week, and hold monthly work days in the summer to paint, remove fences or noxious weeds, or do other tasks refugee staff doesn't have time to complete. Blenden says the group has also played a strong advocacy role for refuges with the Texas congressional delegation. ◆

Addressing Local Concerns through Science: Mapping Beaver Activity

by Susan Georgette

Dramatic shifts in animal populations are nothing new to the Iñupiaq Eskimos of northwest Alaska. Moose and beaver are now commonplace in areas where they were unheard of 50 years ago. But now, beaver have spread so widely that local residents worry about the impact on fish and water quality. So, in cooperation with the tribal council, Selawik National Wildlife Refuge staff is monitoring beaver activity to help the subsistence fishing community whose source of food could be affected by the beavers.

"There were no beaver when we were growing up," one elderly Iñupiaq woman told me, "only way upriver." Now, beaver dams block many small streams and sloughs. Areas long used by the Iñupiat to set their nets for whitefish and northern pike have become inaccessible.

People have adapted — reluctantly — by changing the areas where they fish. One Selawik resident wryly observed, "It's a good thing we have lots of rivers here." Subsistence fishermen nonetheless continue to feel displaced by the abundance of beaver. In northwest Alaska, concern about beavers has been greatest around the 2.1-million-acre Selawik Refuge.

Established in 1980, the refuge is the homeland of the indigenous Iñupiat. Two of their communities lie within the refuge's boundaries. The refuge straddles the Arctic Circle and encompasses a huge maze of waterways and wetlands, producing rich habitat for fish, birds and other northern creatures.

Counting Beaver Dams

As part of the refuge's beaver monitoring strategy, biologists last fall completed an aerial survey of beaver dams, lodges and caches in high-use subsistence fishing areas adjacent to the community of Selawik. They surveyed areas that contained critical feeding and spawning habitats for whitefish as well as key fishing sites for local residents whose diets depend heavily on whitefish, pike and sheefish.

Staff at the Selawik National Wildlife Refuge in Alaska worked with the Native Village of Selawik Tribal Council to plan how to monitor beaver activity. An aerial survey allowed refuge staff to see the number of beaver dams, especially on the smaller streams. The beaver survey was an excellent way to work with the community. (USFWS)

To get the best visibility, the aerial survey was flown after the willow and alder leaves had dropped but before the rivers and streams had frozen. None of the beaver structures appeared to impede whitefish spawning in the main rivers and streams. "We were surprised at the number of beaver dams on some of the smaller streams," said Refuge Biologist Nate Olson. "Some were old, while others were quite active. We now have a much better idea of the beaver activity on the lower river."

The community was pleased that U.S. Fish and Wildlife Service took its concerns seriously and began to document beaver activity. The results will be useful in future research on beavers. In addition, we plan to repeat the survey every few years, which will allow the refuge to monitor trends in beaver activity and distribution. This information will provide a shared basis for discussions with the community about beaver management.

"Animals come and go," one of my elderly Iñupiaq friends has often told me. She should know, having lived off the land for 80 years, moving with the seasons and never attending a day of school in her life. Beavers may eventually retreat again from this corner of their range. In the meantime, we are happy to be working closely with our Iñupiaq neighbors. ◆

Susan Georgette is outreach specialist at Selawik National Wildlife Refuge in Alaska.

Is that a Puffin on My Screen?

If it's spring, it must be time to return to Seal Island. If you're a puffin, that is. It's also time to turn on the video cameras for the second season of showing the world what puffins do.

Seal Island National Wildlife Refuge, closed to the public, has partnered with the National Audubon Society to manage the island for seabirds, including terns, eiders, guillemots and Atlantic puffins. Seal Island was once the site of the largest Atlantic puffin colony in the Gulf of Maine. By the late 19th century, harvesting for meat, eggs and feathers eventually wiped out the colony entirely. National Audubon Society successfully reintroduced puffins to Seal Island, which also supports the largest tern colony in the Gulf of Maine.

In 2006, the Audubon Society placed three cameras around Seal Island, two positioned above ground in puffin and tern nesting habitat. The third camera, placed in an underground burrow, followed the development of a puffin chick. Refuge staff helped transport the gear and the satellite tower to the island.

The cameras are turned on from May through the fall; the greatest bird population can be seen on the island from late May to early August. The best time to see the puffins is from early in the morning until early afternoon, when they go fishing. They begin returning in the evening and generally sleep under boulders at night.

The Web cam images may be viewed live on the Project Puffin Web site during nesting season with "Best of the Puffin Cam" available at other times of the year (http://puffin.bird.audubon.org/puffin-cam.html). You can watch a puffin chick about to fledge, grown puffins grooming themselves, and whole groups of puffins interacting, growling and showing off their colorful beaks (which become larger and more colorful as the birds age).

New way to appreciate an outstanding resource

The refuge works with conservation agencies and private landowners along the coast of Maine to alert visitors to stay off the islands during nesting season. The refuge's islands are closed during this time, so "we have this outstanding resource that is not accessible even by local people," says Brian Benedict, deputy refuge manager at Maine Coastal Islands National Wildlife Refuge.

The Web cam images are transmitted right to the mainland and can be experienced without disturbing the puffins or other seabirds. In July 2006, the National Audubon Society opened a Project Puffin Visitor Center in nearby Rockland. The Web cam images from Seal Island are displayed on a storefront screen visible to passersby as well as on a full wall screen inside.

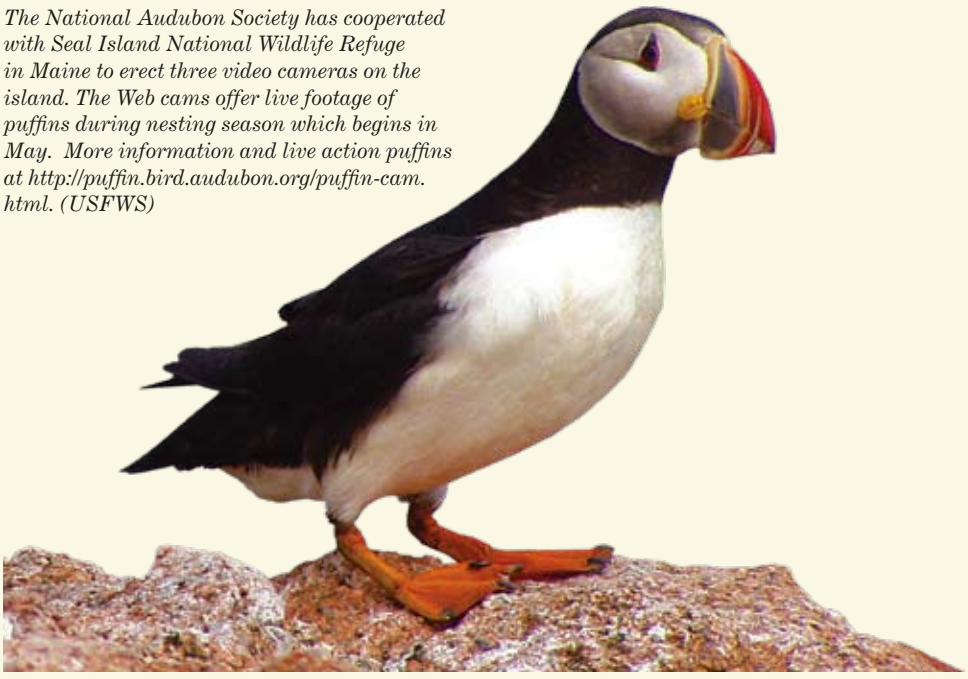
U.S. Fish and Wildlife staff created a large map of the Maine coast that depicts the nesting islands. Refuge Manager Charles Blair is on the advisory board for the Puffin Center. "You come away with an appreciation for just how spectacular these birds really are," says Benedict.

Expanding Tern and Puffin Populations

The refuge is working to expand tern, razorbill and puffin populations on other islands, including Eastern Brothers Island. Plans call for placing tern, puffin and razorbill decoys on Eastern Brothers Island this spring. Two refuge researchers are scheduled to collect information and monitor nesting activity. "We hope to have terns or razorbills nesting this spring," says Blair.

Although Seal Island is closed year-round, eager birders can hop on tour boats that stop near Petit Manan Island, part of the refuge complex. Two-way radios allow tourists to communicate with researchers on the island.

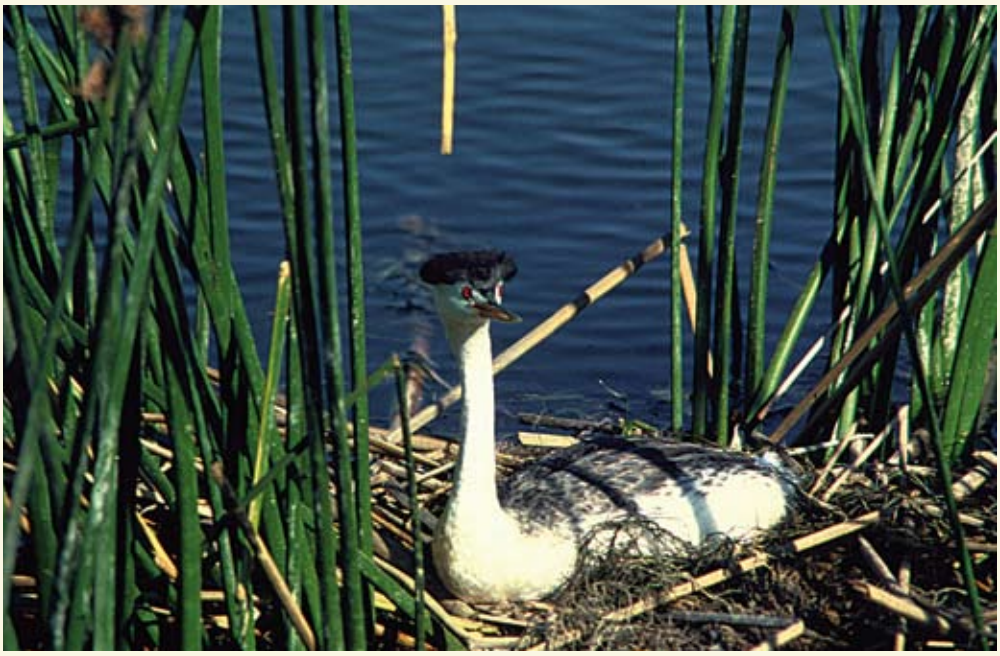
Last year, the refuge also took ownership of the Petit Manan Lighthouse, which had been maintained by the U.S. Coast Guard. Blair says the refuge will not allow any lighthouse visits during the spring and summer nesting season, but he is interested in working in partnership with a lighthouse preservation group or similar nonprofit organization to preserve this important structure. ◆



The National Audubon Society has cooperated with Seal Island National Wildlife Refuge in Maine to erect three video cameras on the island. The Web cams offer live footage of puffins during nesting season which begins in May. More information and live action puffins at http://puffin.bird.audubon.org/puffin-cam.html. (USFWS)

A DAY FOR THE BIRDS

Ray Conrad is a cowboy poet and painter in Utah who enjoyed his first birding adventure in the middle of winter. He signed on for the Christmas Bird Count, actually held New Year's Eve, at Fish Springs National Wildlife Refuge in Utah. The adventure was sheer poetry.



Birds of a feather flock together. That's
how the old bromide reads.
And it's true. I seen 'em last weekend,
out in the West Utah weeds.
Thousands and thousands of waterfowl, a
startling amount,
When a bunch of us stayed out by
Fish Springs, for the Audubon
Christmas count.
I'm sure I could have remained at home,
for all the input I made.
I ain't no pro. I wouldn't know a grebe
from a hand-grenade.
But I took notes, and sat and wrote how
many birds, and which,
And I also correctly identified some signs
there along the ditch.
But we saw teals and pintail ducks, and
mallards and coot and all.
And once, amongst a bunch of coot was a
little old black gadwall.
The horned lark, he was out there in
force, in bunches of six, eight or ten.
Or else it was one bunch a-leadin' us on,
so we'd count them over again.
There were swans and geese and marsh
hawks and sparrows and rails and
barn owls, too,
And coyotes patrolled the phragmites, to
find something good they could chew.
There's birds they call the yellowlegs, a
lesser and also a greater,
And a harrier killed one in front of my
eyes, but I'll feel better later.
A prairie falcon was making a meal of a
dead coot out on the ice.
That falcon is a handsome guy, but he
didn't behave too nice.
Birds of prey are birds of prey, they
survive by inflicting death.
It's nature's law, but it's tough to watch,
and I hope they get bad breath.
The bird boss took us down to the
spring where the black-crowned
night herons nest.
He said to count only the herons, right?
Forget about all the rest.
So he booed 'em out with a mighty shout,
and the sky was a black cloud of wings
They claimed there was thirty-eight
herons amongst.
All I seen was hundreds of 'things'.
Anyways, it was a glorious time on a
chilly cold New Year's Eve day,
And we all went shivering back to the
house for hot chili and boxed Cabernet.
Next time I'll be ready. I'm studying a
bird, 'though my focus might be a
tad narrow.
But I'll be right on top of my game if I
see a savannah sparrow.
You ought to come out for the CBC*, and
a big taste of nature's bounty,
To the Fish Springs National Wildlife
Refuge, in foggy, dark Juab County.

**Christmas Bird Count*

By Ray Conrad, Scribe and author

This BAER Doesn't Bite

by Eugene Marino

Thirty-two new archaeological sites and several historic cabins have been discovered on Alaska refuges during work funded by the Burned Area Emergency Rehabilitation Program (BAER). The first material remains of a prehistoric culture at Yukon Flats National Wildlife Refuge have been discovered and the first-ever archaeological survey has been completed within Kanuti National Wildlife Refuge.

Both refuges are so remote that they have not previously benefited from the work of BAER teams. BAER's application to cultural resources is invaluable, not only by allowing examination of cultural resources affected by fire, but by recognizing the importance of these resources to the larger sphere of land management before and stabilization after a fire. The cabins and other historic materials will now benefit from planning to minimize the future impact of fire.

The BAER program includes the Forest Service, National Park Service, Bureau of Land Management and Bureau of Reclamation in addition to the U.S. Fish and Wildlife Service. BAER teams address a variety of issues on public lands where prescribed burns are used as a management tool. A BAER team typically includes hydrologists, soil scientists, engineers, biologists, silviculturists and range conservationists, among others. Archaeologists have come to be integral members of the teams as cultural resource information is critical when refuge fire management plans are being written.

Archaeologists can identify sites that might be affected by a prescribed burn. Depending on a site's vulnerability to fire damage, a fire management plan might call for using a different management tool. During summer 2006, BAER teams evaluated burn areas at Kanuti and Yukon Flats National Wildlife Refuges to identify and prescribe treatments to protect land and cultural resources.

Ancient Gwich'in Athabascan Artifact Found

On Yukon Flats Refuge, teams examined four large burn areas, totaling some 612,000 acres. The examinations used archaeological data gathered in the 1950s and focused on areas favorable to archaeological sites — mostly the confluences of streams with larger rivers or on bluffs over looking rivers.

In addition to 30 previously recorded sites, 12 new archaeological sites were discovered and recorded at Yukon Flats Refuge, a significant increase for such a remote refuge that covers nearly 9 million acres. One site contained a notched stone net sinker, dating to between 4000 and 2000 B.C. when the area was inhabited by ancestors of the Gwich'in Athabascan residents of the refuge. This is the first material evidence of this ancient culture, and it could spark interest in further research by the state or universities.

Investigators also located the foundations of several historic cabins along portions of the Caro Trail, a horse trail that greatly assisted Alaska's booming gold industry. Cabins were built about every 10 miles along the trail that ran from the Yukon River to the Chandalar gold fields, allowing travelers to find shelter within a day's journey. The Caro Trail, known locally as the Government Road, was abandoned during the Depression of the 1930s. Site information recovered from Yukon Flats Refuge can now be used for refuge management planning.

First archaeological investigation at Kanuti Refuge

Investigation at Kanuti Refuge, the first archaeological survey within the refuge, documented location of 20 sites. Most are remains of early 20th century trapping and hunting camps, but one is the only known prehistoric site on the 2.5-million-acre refuge.

The habitat we manage today owes its character to how it was managed historically. BAER enables us to monitor, evaluate and verify the existence of archaeological and cultural treasures, even on two refuges rarely visited by archaeologists. ◆

Eugene Marino is the U.S. Fish and Wildlife Service archaeologist.

Last year, BAER teams evaluated burn areas at Kanuti and Yukon Flats National Wildlife Refuges to identify and prescribe treatments to protect land and cultural resources. (USFWS)

FOCUS. . .*On Fish Conservation*

For the Future of Fish Resources

by Dr. Mamie Parker

"There is no shortage of prime examples of national fish hatcheries and national wildlife refuges working together for conservation."

On the 136th birthday of the Fisheries Program on February 9, I looked over the original charge given to the U.S. Commission of Fish and Fisheries by the Congress in 1871 and saw parallels to contemporary circumstances and most certainly commonalities between the Fisheries Program and the National Wildlife Refuge System.

The ancestral agency of Fisheries was charged with investigating essentially two things: populations of wild animals, and their habitats. Congress demanded the Fish Commission be guided by someone of "proved scientific and practical acquaintance with the fishes."

Then, as now, the spoiling of habitat was the greatest of privations to fish and wildlife, and so habitat conservation is at the center of both the Refuge System and the Fisheries Program.

That conservation effort is carried out in our division of Fish and Wildlife Management Assistance, where I liken our capable scientists to medical practitioners prescribing remedies to fix habitat problems or augmenting fish populations from stocks produced by our National Fish Hatchery System. There is no shortage of prime examples of national fish hatcheries and national wildlife refuges working together for conservation.

In Wisconsin, the Genoa National Fish Hatchery and the LaCrosse Fishery Resources Office rely on Upper Mississippi River National Wildlife and Fish Refuge to help promote fisheries conservation. The hatchery, located on the refuge, works with refuge personnel

The Recreational Boating and Fishing Foundation provides marketing and educational resources at www.rbff.org. The Foundation's new Anglers' Legacy campaign is built on the premise that the overwhelming majority of people who are taught to fish by a veteran angler continue to fish. (USFWS)

Fishing for Adventure and Diversity on National Wildlife Refuges

A local fishing column in Palm Beach, Florida, referred to Arthur R. Marshall Loxahatchee National Wildlife Refuge as a "hidden gem" where anglers can find "plenty of bass, speckled perch, bluegill, Mayan cichlids and other rod-bending fish." That refuge is hardly the only fishing "gem". Sport fishing is available at more than 270 national wildlife refuges, which host about 7 million angling visits every year.

Recreational fishing is just one of the six wildlife-dependent recreational pursuits considered a public priority in the National Wildlife Refuge System Improvement Act. Little wonder. Citizens who participate in recreational fishing tend to place a higher value on conservation of aquatic resources and are more likely to develop a personal conservation ethic.

Sixteen percent of Americans fish regularly; 88 percent have tried it at least once. A Memorandum of Understanding among the U.S. Fish and Wildlife Service, the Sport Fishing and Boating Partnership Council, the Association of Fish and Wildlife Agencies and the Recreational Boating and Fishing Foundation, effective until 2009, seeks to increase the number of people who fish as well as public awareness of the need to conserve aquatic resources.

National Fishing and Boating Week

Many refuges promote fishing during National Fishing and Boating Week (June 2-10, 2007). Necedah National Wildlife Refuge in Wisconsin, for

to collect up to 40 million eggs from cool water fishes, like walleye and northern pike. Those resulting fish are used in endangered mussel propagation or stocked for important sport fisheries on the refuge, tribal waters and state-managed fisheries.

Genoa NFH stocks predatory northern pike and walleye on Horicon National Wildlife Refuge in advance of the carp spawn. When young carp hatch, there are hundreds of thousands of hungry mouths waiting to eat unwanted invasive fish.

In Mississippi, St. Catherine Creek National Wildlife Refuge provides a reliable brood stock of the alligator gar, the nation's second largest freshwater fish, for Pvt John Allen NFH. Each spring, when alligator gar are getting gravid, refuge staff watch for spawners and then help hatchery biologists catch brood stock.

In Oklahoma, Tishomingo NFH and Sequoyah National Wildlife Refuge work to conserve alligator snapping turtles, bred in captivity at the hatchery, raised and placed at the refuge, and followed by researchers with radio transmitters. The fish hatchery and Tishomingo National Wildlife Refuge share a nonprofit Friends group as well as TREES, Tishomingo Refuge Ecology and Education Society, which in September 2006 helped organize National Hunting and Fishing Day at both facilities.

We can't possibly name all of the outstanding cooperative programs that are conducted by Fisheries and the Refuge System, but together we work to ensure that healthy fish populations will be passed on to a new generation of outdoor enthusiasts and conservationists. ◆

Dr. Mamie Parker is Assistant Director, Fisheries and Habitat Conservation

The original charge given to the U.S. Commission of Fish and Fisheries by the Congress in 1871 was to investigate essentially two things: populations of wild animals and their habitats. Then, as now, the spoiling of habitat was the greatest of privations to fish and wildlife. (USFWS)

example, hosts a day of games, boat rides and derbies to promote fishing among young people. Pea Island National Wildlife Refuge in North Carolina holds an annual Crabbing and Fishing Derby. Lee Metcalf National Wildlife Refuge in Montana holds a kids' fishing clinic, where youngsters also learn about fish biology and the role of the refuge in conserving fisheries resources.

With 1,500 miles of streams and rivers, and more than 500 lakes larger than 25 acres, Togiak National Wildlife Refuge in Alaska offers some of the finest sportfishing in the world. Togiak Refuge partners with local Scout troops to provide fishing clinics that offer instruction in everything from fish biology to tackle, knot tying, casting, hooking, and releasing fish.

Togiak Refuge also cooperates with many state, regional and local educational groups to teach about area fish at two science camps, including a week-long float trip through the heart of the Togiak Wilderness. Local youth learn fly-fishing on a river that hosts sport anglers from around the world. "The opportunity that we provide for young people to explore the outdoors and understand the different values that subsistence, commercial, and sport users place on the fishery resource is one of the most important things we do," says Refuge Manager Paul Liedberg.

The nonprofit Recreational Boating and Fishing Foundation (RBFF), funded by federal taxes collected on the sale or manufacture of motorboat fuel and fishing tackle, was established in 1998 to increase participation in recreational fishing and boating. The RBFF creates marketing, educational and event planning materials, available to refuges and others.

Anglers' Legacy

In addition to its longstanding "Take Me Fishing" program, RBFF launched "Anglers' Legacy" in 2006 to reach avid and veteran anglers. The foundation has created posters, event signs and banners to encourage avid anglers to sign an online pledge to introduce someone new to fishing. RBFF has found that most people who learn to fish from a veteran angler continue to fish. In a survey of more than 700 anglers, more than a third who had seen campaign advertising last year had taken a new person fishing and 76 percent said they would do it again within the next year.

According to RBFF President and CEO Frank Peterson, "Conservation is based on valuing natural resources, and avid boaters and anglers are often among those who most value the aquatic environment. Through fishing license sales, equipment sales taxes and taxes on boat fuels, anglers and boaters directly contribute hundreds of millions of dollars annually to fund aquatic conservation efforts. That's why introducing people to fishing and boating is critical to keeping conservation funds flowing."

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FOCUS. . .*On Fish Conservation*

Protect, Restore and Enhance Aquatic Habitats

Coles Creek is a native brook trout stream on private land in Wisconsin. After a complex mix of construction, erosion control and habitat restoration by a variety of partners including Necedah National Wildlife Refuge, Coles Creek is now a Class 1 trout stream. The National Fish Habitat Action Plan was set in motion in March 2006 to protect, restore and enhance similar fish habitats across North America. (USFWS)

Since 1900, 123 aquatic freshwater species have become extinct in North America. Of the 822 native freshwater fish species in the United States, 39 percent are at risk of extinction. Estuaries provide habitat for 80-90 percent of the recreational fish catch in the country, yet between 1992 and 1997, more than 32,600 acres of wetlands disappeared every year.

With these statistics in mind, the National Fish Habitat Action Plan was set in motion in March 2006 by state fish and wildlife agencies and 19 federal agencies, including the U.S. Fish and Wildlife Service, to more effectively use new and existing resources to protect, restore and enhance fish habitats across North America.

Organize or Join a Fish Habitat Partnership

The plan calls for regional Fish Habitat Partnerships to be organized around important aquatic habitats, distinct geographic areas or keystone fish species. Five partnerships are already underway and 12 are expected to be in place by 2010.

These partnerships are expected to identify specific projects and the resources to fund them. Tom Busiahn, the U.S. Fish and Wildlife Service coordinator for the Action Plan, says

Taking Care of the Trout

"Take care of the fish, then the fishing will take care of itself." That was the guiding principle of Trout Unlimited when it was formed in 1909; today, it applies to the work of several national wildlife refuges, often working in partnership with Trout Unlimited, other government agencies and nonprofit organizations.

Invasive bass threaten trout

Lake Umbagog National Wildlife Refuge in Maine and New Hampshire is a partner in the Eastern Brook Trout Joint Venture, one of the first pilot projects under the National Fish Habitat Initiative. A Joint Venture Assessment Team learned that populations of brook trout were intact in only 5 percent of the streams, lakes and ponds from Maine to Georgia and west to Ohio, where they had thrived historically. Native trout had vanished entirely from a fifth of the streams and rivers in these areas and the population is reduced in Lake Umbagog itself.

Lake Umbagog Refuge Manager Paul Casey says the biggest threat to trout

there could be $1 million to $3 million for plan projects in fiscal 2007. The Service is working with the National Fish Habitat Board on a system for distributing those funds. Busiahn says the real value of the Initiative is that it calls for a more strategic investment of resources as well as measurement of results. By 2010, the Initiative is scheduled to provide a first-ever report on the state of aquatic habitat nationwide.

Refuge involvement in Fish Habitat Partnerships

National wildlife refuges are participating in several of the existing partnerships. The Driftless Area, Trempeauleau and Upper Mississippi River refuges are partners in the Midwest Driftless Area Restoration Effort, which is completing its draft strategic plan. The partners will work together to enhance populations of native fish, including brook trout and smallmouth bass, reduce sediment, improve water quality and increase opportunities for recreational fishing in portions of Minnesota, Wisconsin, Iowa and Illinois.

Three refuges are expected to be active partners in the Eastern Brook Trout Joint Venture – Lake Umbagog National Wildlife Refuge in Maine, Silvio O. Conte National Wildlife Refuge in the Connecticut River watershed and Canaan Valley National Wildlife Refuge in West Virginia. This partnership is restoring aquatic habitat for the Eastern brook trout, as described more fully in the story on page 12.

Bear Lake and Kootenai National Wildlife Refuges in Idaho have both submitted habitat restoration proposals as part of the Western Native Trout Initiative. This partnership will be developing a West-wide strategic plan to stop and reverse declines of western native trout. The Matanuska-Susitna Salmon Conservation Partnership supports fish habitat conservation for Chinook, coho, sockeye, pink and chum salmon in southcentral Alaska.

The Southeast Aquatic Resources Partnership is developing an aquatic habitat plan that will cover 13 states and numerous major rivers and watersheds. This region includes 34 percent of the North American fish species considered endangered, threatened or of special concern. The partnership is considering aquatic habitat restoration projects from Hatchie, Noxubee and Merritt Island National Wildlife Refuges.

What's in a Partnership?

New Fish Habitat Partnerships will be recognized according to certain criteria and will be eligible for funding sources that are to be created specifically for the National Fish Habitat Action Plan projects. To be eligible for funding, these partnerships must include diverse groups – including refuges where appropriate - focused on conserving fish habitat across boundaries of ownership and jurisdiction. Each partnership must identify fish and aquatic habitat priorities within its geographic area and then develop a strategic plan that addresses causes of system decline rather than simply treating symptoms.

"The need to protect, restore and enhance aquatic habitats has never been greater," says an early report from the Initiative. "The ultimate goal of the Initiative is to work closely with partners and stakeholders to build a future that ensures healthy fish, healthy habitats, healthy economies and healthy people." ◆

For more information on refuge opportunities with the National Fish Habitat Action Plan, contact Tom Busiahn at 703-358-2056 or tom_busiahn@fws.gov, or visit www.fishhabitat.org.

is small-mouthed bass, a popular but non-native species that was illegally introduced to the lake 20 years ago and now feeds on trout fry. The refuge partnered with the Save the Rapid River Coalition to tag trout and bass as well as salmon to determine exactly where the fish are competing and how this competition can be controlled, both in the lake and in the Rapid River, which flows into the lake.

The long term goal is to manage the various fish populations in order to maintain the native brook trout population of the lake and rivers. Ultimately, the Eastern Brook Trout Joint Venture wants to bring back healthy, fishable brook trout populations throughout their eastern United States range.

535 LUNKERS

Trout have already returned to streams near Necedah National Wildlife Refuge in Wisconsin. With $74,000 from Partners for Fish and Wildlife and several Challenge Cost Share grants, the refuge paid for materials and provided technical expertise to restore 5.8 miles of Coles Creek between 1999 and 2006. Coles Creek is a native brook trout stream on private land. The restoration involved a complex mix of construction, erosion control and habitat restoration.

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Biologists at the Ashland Fisheries Resource Office are stocking coaster brook trout eggs, fry and yearlings in Whittlesey Creek National Wildlife Refuge in Wisconsin. They hope the fish in the creek will swim into Lake Superior and return to the creek to spawn and repeat the cycle. (USFWS)

Carping at Carp

Natural resources managers are concerned that Asian carps have the potential to cause extensive and irreversible changes to the aquatic environment, jeopardizing the long-term sustainability of native aquatic species. They are a particular problem for threatened and endangered species, according to the Draft Asian Carp Management and Control Plan. (USFWS)

Depending on your point of view, Asian carps can be dinner on the table, a management tool, bait to catch larger fish or invasive nuisance fish that need to be eliminated. For the National Wildlife Refuge System, they are most often the latter. A national management plan has been drafted to help federal land managers and others who must confront the carp challenge (available at www.ANStaskforce.gov).

Several carp species native to Asia, including the common carp, have been introduced into the United States. The management plan specifically addresses the four species that were legally brought to the United States in the 1960s and 1970s for their potential as management tools and in aquaculture production.

Bighead carps are used in catfish production to improve water quality and catfish growth rates. Grass carps have been stocked in most states to control nuisance vegetation. Bighead and grass carps are also transported and sold as food fish (usually live) in Asian markets in the United States and Canada. Black carps control snails in aquaculture ponds. Now these three carps plus silver carp have all made their way into the environment.

Carps jeopardize native species

Natural resources managers are concerned that Asian carps have the potential to cause extensive and irreversible changes to the aquatic environment, jeopardizing the long-term sustainability of native aquatic species. They are a particular problem for threatened and endangered species, according to the Draft Asian Carp Management and Control Plan.

Greg Conover, who chairs the Asian Carp Working Group of the Aquatic Nuisance Species Task Force for the Service, acknowledges this is an aquatic nuisance species with its own constituency of individual and commercial consumers. That makes the management and control of these fish especially challenging.

The draft plan calls for the extirpation of Asian carps in the wild, but "what's more realistic," says Conover, "is to contain the Asian carps within existing boundaries and then reduce some of

What's Melting: Togiak Refuge Sizes Up Its Glaciers

— continued from pg 3

Global warming researchers will be closely watching the Togiak study, whose findings will be included in reports circulated by the regional office and made available to other government agencies and independent researchers. The Togiak Refuge study does not have a specific end date. Professional journals that address global climate change might be another outlet for the information.

"The Ahklun glaciers are relatively small," Walsh said. "They are better indicators of change than massive ice fields."

Are the glaciers that have disappeared gone for good? Probably not, Walsh said. "They come and go with changes in the climate. Sooner or later, the glaciers that are melting away will begin expanding." ◆

Michael Wright is a contract writer-editor in the Refuge System Branch of Communications.

these populations so they have minimal impact on the environment." It has proven extremely difficult to completely eradicate an aquatic nuisance species after it has become established in a new system.

Prevent, contain, reduce and minimize

The plan includes 129 recommendations. While none is specific to the Refuge System, many are relevant to individual refuges which may foresee or already have a problem with invasive carps. The recommendations fall into four arenas:

- prevent the introduction of Asian carps;
- contain feral populations by preventing their dispersal;
- reduce their abundance in the wild; and
- minimize the negative impact of Asian carps.

The plan recommends that land managers evaluate if and where carps are already established and prepare a rapid, pre-planned response if carps are found. Asian carps are a national issue and concerns about these fish are not limited to the Mississippi River Basin. Even if there are no carps now, warns Conover, "be aware that three or four carp species are still in commercial use and any watershed those fish cross is at risk. Anytime you are transporting live fish, there is a potential for fish to be introduced to different bodies of water."

In 2006, Conover worked with wildlife biologist Mike Brown at Crab Orchard National Wildlife Refuge in Illinois to investigate a fishkill in a basin below Crab Orchard Lake. Crab Orchard Refuge has no major tributary to the Mississippi or Ohio River, yet silver and bighead carps were found on the refuge in a small tributary stream.

"We looked at where the fish are and tried to determine whether the fish could move from below the spillway up into Crab Orchard Lake and disperse further on the refuge," said Conover. Brown and Conover concluded that the fish would not be able to move up to the lake on their own, but they could be brought there accidentally by fishermen collecting the small carps as bait to use in the lake. They agreed an information campaign was needed to inform the public not to move fish from the spillway into the lake.

Conover's office (Carterville Fishery Resources Office) has also worked with Middle Mississippi River National Wildlife Refuge evaluating the fishery in backwaters on Harlow Island. "We found that Asian carps are the predominant fish in these backwaters," said Conover, "which confirms the need for large scale habitat restoration to create habitats more favorable for native fishes."

The draft plan identifies eight potential tools to reduce populations of Asian carps, but Conover says harvesting the culprit fish is really the only readily available tool. Strategies such as stocking sterile or genetically modified fish to reduce reproductive success and survivability of wild carps are very technical and require considerably more research before they can be integrated into a comprehensive management approach. Another promising area of research is the use of pheromones to repel or attract carps. Conover believes refuges, especially those along the Mississippi River, are likely to provide some of the initial field evaluations of these various control mechanisms. ◆

Fishing for Adventure and Diversity on National Wildlife Refuges — *continued from pg 11*

RBFF has also created tip sheets that can be downloaded and given to refuge visitors. Topics range from freshwater fishing to fishing terminology, how to tie basic fishing knots and hook bait, finding bait in your backyard and basic boat care. The Foundation's Passport Program provides teaching tools and activities to introduce families to fishing and boating.

In 2008, RBFF will have exhibits at a variety of fishing and boating shows around the country, often including a casting pond. Interested refuges may offer short seminars or simply make printed information available at an RBFF booth. Information about upcoming RBFF events is available at www.rbff.org , where you can sign up for an electronic newsletter.

After more than a decade of decline, the number of paid fishing licenses in the United States increased by more than 500,000 in 2004, according to the National Fishing License Report. ◆

Whatever Happened To…

Desert bighorn sheep population plummets

The population of desert bighorn sheep at Kofa National Wildlife Refuge in Arizona has dropped from 623 in 2003 to 390 in 2006, and that followed a drop of almost 200 sheep during the 2000 survey. "The downward trend in two consecutive surveys has me worried," said Kofa Refuge Manager Paul Cornes. "Normally the population goes up and down, but not this far down." The goal has been to have a herd of 800 sheep on Kofa Refuge.

In light of the population trends, Cornes says the translocation of Kofa sheep to other refuges has been indefinitely cancelled. This year would have been the 50th anniversary of Kofa's efforts to supplement or establish other herds in the southwest. But Cornes says the transplants are "on indefinite hold until we can figure out what's going on with the refuge's bighorn sheep population." One of those transfers, from Kofa Refuge to San Andres National Wildlife Refuge in New Mexico, was described in *Refuge Update* July-August 2006.

Cornes believes that the long and extraordinarily severe drought over the last decade is a significant factor in the population declines. There is also concern locally that mountain lion predation may be contributing to the decline, as there is evidence of more mountain lions on the Kofa and adjoining lands.

Research was initiated in 2006 to investigate the interaction between mountain lions and the refuge's bighorn sheep. Cornes says that state and refuge biologists are also working on a white paper that will address all possible factors in the declining number of sheep, including human disturbance, disease, predation, hunting and water availability. He expects to have preliminary findings and recommendations within the next month.

The population of desert bighorn sheep at Kofa National Wildlife Refuge in Arizona has dropped precipitously for two population surveys in a row. While state and refuge biologists try to figure out why, the transfer of sheep from Kofa Refuge to other refuges has been indefinitely cancelled. (USFWS)

Float Plane Removed from Kenai

After a single engine float plane made an emergency landing in the midst of Kenai National Wildlife Refuge in Alaska in August 2006, refuge staff, mechanics and the plane's operator spent months figuring out how to get the plane off the refuge.

The goal had been to remove the plane with as little damage as possible to the plane or the fragile terrain. However, because the plane had both engine problems and additional damage caused by high winds, the decision was made to disassemble the de Havilland Otter DHC-3. The refuge granted permits for a helicopter to make multiple flights to remove all the pieces.

It took five trips with a Bell 204 Super Huey helicopter to remove it all. The floats were frozen to the tundra and had to be heated before they could be moved. By nightfall on December 12, 2006, all was tranquil again on the refuge and Deputy Refuge Manager Jim Hall said there was no lasting impact to wildlife or terrain.

Cow Pasture to Salt Marsh

A "welcoming the tides" ceremony late last year marked the restoration of 130 acres of former pasture to salt marsh. Braget Marsh, named for the Norwegian immigrant family that farmed the land for more than a century, is now owned by the Nisqually Tribe, but managed by the refuge under a cooperative agreement. The land is within Nisqually Refuge. The

The first-ever captive-bred endangered Sonoran pronghorn were released into their historic Arizona habitat in November 2006. Two yearling males born in an enclosure on the Cabeza Prieta National Wildlife Refuge in Arizona last spring have now joined other wild pronghorn on the refuge. Two more were released in January. (USFWS)

restoration was completed by the tribe, with Nisqually National Wildlife Refuge as a partner.

The refuge's Comprehensive Conservation Plan calls for restoring an additional 700 acres of estuary, making this the largest estuarine restoration project in the Pacific Northwest. In *Refuge Update* November-December 2005, Nisqually Refuge Manager Jean Takekawa explained that estuarine habitat is increasingly beleaguered on the West Coast. This restoration will increase tidal salt marsh habitat by 46 percent in south Puget Sound. Estuary restoration was identified as the highest priority to recover threatened chinook salmon in the Nisqually watershed.

Sonoran Pronghorn Released

The first-ever captive-bred endangered Sonoran pronghorn were released into their historic Arizona habitat in November of last year. Two yearling males born in an enclosure on the Cabeza Prieta National Wildlife Refuge in Arizona last spring have now joined other wild pronghorn on the refuge. Both were seen during the December 2006 population survey flights with a group of 10 pronghorn on the refuge.

The first release back to the wild "is a highly significant action toward the continuing welfare of the species," says Michael Coffeen, Sonoran pronghorn recovery team coordinator. "The fact that they have joined up very quickly with a wild group of pronghorn is very gratifying." Two more yearling males born in the enclosure were released in January. There are plans to release seven more yearling males and females on the refuge next winter.

As described in *Refuge Update* November-December 2006, the Sonoran pronghorn population had dipped to an all-time low of 21 in 2002. A 640-acre, semi-captive breeding facility was built on the refuge in 2003 and stocked with pronghorn from the refuge and Mexico. Nine fawns were born in spring 2006. ◆

A New Land Bridge Forms Naturally on Cape Cod — *continued from pg 24*

potential for breeding. As part of the vigilant predator control program, more volunteers will be working near the land bridge during holidays and weekends to help educate the public about the plight of piping plover, common terns and the other birds that find the water they need at Monomoy Refuge.

Indeed, the refuge's experience with the Avian Diversity Program, which keeps down the number of black-backed gulls and herring gulls that prey on or harass the birds, has also shown the refuge the importance of public communications.

The refuge learned from the Avian Diversity Program that ongoing communications with the public is essential.

"With the new bridge, we also have to anticipate the impact of more beachgoers and dogs crossing onto the refuge," says Law Enforcement Officer Chad Roderick. Visitors are welcome to explore most of the refuge, although portions are closed in the spring and summer to protect nesting and staging birds. Closures will include the newly attached site.

Although wildlife needs are the greatest issue, the refuge also has to deal with the needs of the U.S. Coast Guard and Town of Chatham, which ask for access to refuge lands for their emergency vehicles. Refuge staff is now putting protocols in place to protect the public as well as the integrity of the designated Wilderness Area and to be in compliance with the Endangered Species Act. ◆

Michael Brady is refuge manager and Monica Williams is wildlife biologist at Monomoy National Wildlife Refuge in Massachusetts.

Around the Refuge System

Two greater flamingos came a long way before finding each other at Aransas National Wildlife Refuge in south Texas. The pale pink bird – a species from Africa - escaped the Sedgwick County Zoo in Wichita, Kansas, while the more brightly colored flamingo flew in from Mexico. By the end of January, the two were still together but had flown out of the refuge and on up the Texas coast. (Ken Rice/USFWS)

TEXAS

A record number of migrating whooping cranes landed in Aransas National Wildlife Refuge in south Texas this past winter, indicating that the national icon that nearly went extinct six decades ago is making a comeback. Among the 234 cranes wintering on the refuge were 45 chicks, including seven sets of twins. Loss of habitat and hunting drove the numbers down to just 15 cranes in the 1940s.

Aransas Refuge also hosted an unusual pair of flamingos earlier this year, including one that escaped from the Sedgwick County Zoo in Wichita, Kansas, 600 miles away. This pale bird was then joined by a wild Caribbean flamingo that had been banded in Mexico. Both birds were identified by their leg bands. "We don't know how they found each other," says Aransas biologist Chad Stinson, "but if you are two pink birds on a green landscape, I guess it's not hard."

The pair stayed together on the refuge for several months before disappearing in January. A Texas birding blogger said the two had been photographed on a shallow tidal lake in the lower Guadalupe Delta area of Texas, about 75 miles away. "We're hoping they come back next year," says Stinson.

PENNSYLVANIA

The Folcroft landfill has been polluting Darby Creek and Tinicum Marsh outside Philadelphia for decades. The former landfill became part of the John Heinz National Wildlife Refuge at Tinicum in 1980 but it was not until 2006 that the U.S. Environmental Protection Agency finally signed an agreement with 14 "potentially responsible parties" to determine the extent of contamination and clean it up. These parties include the Delaware County Solid Waste Authority and a number of corporations.

A 1980 report says the landfill contains oil wastes, solvents, pesticides, heavy metals, radioactive and hospital waste. The cleanup could take years and refuge manager Kate McManus says the area may never open to the public but could become home to raptors and grassland-nesting birds.

FLORIDA

The number of loggerhead sea turtle nests counted statewide in Florida is down almost 40 percent since 1998, according to a survey by the Florida Fish and Wildlife Conservation Commission, yet the number of nests at Archie Carr National Wildlife Refuge is going up – from 7,599 nests in 2004 to 9,000 in 2006. Archie Carr Refuge is considered one of the most important nesting areas for loggerheads in the western hemisphere. The sea turtles are threatened by commercial fishing, coastal development and ocean pollution.

The storms that unexpectedly ripped through central Florida at the start of February spared just one of the 18 juvenile whooping cranes that had arrived at Chassahowitzka National Wildlife Refuge on January 12 after following an ultralight plane from Necedah National Wildlife Refuge in Wisconsin as part of their migration training. All were part of the Whooping Crane Eastern Partnership's "Class of 2006," the sixth group of whooping cranes, which are annually

bred at Patuxent Research Refuge in Maryland, flown to Necedah Refuge to spend the summer, and then led on their first migration south. All 17 juveniles died in the enclosure that protects new arrivals from predators. The storms struck with no warning and no time to plan ahead. The surviving juvenile joined the flock from earlier classes.

"While we are still recovering from the initial shock of the loss of so many young birds, the survival of one bird demonstrates the resilience of this particular crane, and our partnership will bounce back as well," said John Christian, co-chair of the Whooping Crane Eastern Partnership, of which the U.S. Fish and Wildlife Service is a founding member. A "Remembering the Class of 2006" fund has been established at http://www.operationmigration.org/rememberingclass06.html.

MONTANA

Who says Punxsutawney Phil can't be beat in the weather predicting game? For a couple of years now Bitterroot Bill, a yellow-bellied marmot living under a barn at Lee Metcalf National Wildlife Refuge in Montana, has been weighing in on the end of winter and his record is 100 percent. This year he is predicting six more weeks of winter.

On Groundhog Day, February 2, Visitor Services Professional Bob Danley led a troop of kids, parents and local media to Bill's barn. Mayor Bill Meisner of Stevensville came dressed in a costume from the Lewis and Clark era, ready to send youngsters on an expedition to find Bill. After a bit of training in how to identify a marmot's burrow and tracks, a 10-year-old reported finding fresh tracks. He concluded that Bill saw his shadow and predicted six more weeks of winter. "We're getting people to realize that wildlife isn't some dry history," said Danley.

Bitterroot Bill is a yellow-bellied marmot living under a barn at Lee Metcalf National Wildlife Refuge in Montana. He chirps his predictions about winter's end – and so far his predictions have been right on target. (USFWS)

CONGRATULATIONS!

Kenai National Wildlife Refuge has been recognized by the Alaska Department of Fish and Game for its support of hunter education programs. Seven refuge staff members volunteer as instructors of basic hunter and bowhunter education courses. Refuge Manager Robin West was honored as the local volunteer instructor of the year for leading the most courses in 2006. The refuge saw a 300 percent increase in the number of students who completed a hunter education program in 2006 as compared with a year earlier.

Diane Borden-Billiot, outreach coordinator for the Southwest Louisiana National Wildlife Refuge Complex, was named one of six outstanding women by the *Southwest Louisiana Times* for her dedicated work in wildlife conservation. Borden-Billiot has spent 16 years in Louisiana, beginning as a wildlife biologist at Sabine National Wildlife Refuge. She has taken on a wide array of public information responsibilities for the refuge complex.

The National Bison Range received a first place award from the National Association of Interpretation for the publication *Buffalo Country: America's National Bison Range.* The book recounts the history of the American bison, the creation of the National Bison Range and the life of Big Medicine, a white buffalo born on the range. *Buffalo Country* is illustrated with the photography of refuge volunteer Donald M. Jones.

Wildlife Cooperatives – A New Tool for Conservation Beyond the Boundaries

by Larry Williams

The State of Texas learned early the value of wildlife cooperatives, and it has facilitated development of about 100 such organizations since the first one formed in 1972. Texas is now reaping the benefits of broader implementation of wildlife management actions. So far, only a few national wildlife refuges are realizing the benefits of such cooperatives.

Wildlife cooperatives, also known as wildlife management associations, have evolved as one more way to operate in the greater geographic and political landscapes. From the U.S. Fish and Wildlife Service's Partners Program in the 1980s and the implementation of ecosystem management teams in the 1990s, to the Department of the Interior's support for cooperative conservation and the incredible rise of Friends organizations, those concerned about landscape level conservation have recognized the importance of reaching out to partners and stakeholders. Wildlife cooperatives are a next, logical step.

Butte Sink National Wildlife Refuge in California participates in a wildlife cooperative known as the Butte Sink Waterfowl Association. The association includes many waterfowl hunting clubs and addresses such problems as water quality and delivery, waterfowl disturbance and mosquito control. (USFWS)

They are simply collections of neighboring landowners who formally and voluntarily agree to cooperate in managing local wildlife. In Texas, some landowners joined for enhanced hunting, birdwatching or fishing; others just wanted to improve their local environments. Whatever their reason, they learn to approach wildlife management across a larger landscape. Participating landowners in Texas often agree to comply with recommendations in a management plan developed with the help of a Texas Parks & Wildlife Department (TPWD) biologist.

Cooperatives typically focus on conserving and managing game animals. However, as the Refuge System has proven so many times, when you conserve one species, you inevitably conserve many species and habitats. The rare plants and beautiful landscapes Americans see today on national wildlife refuges are ready proof of that.

Cooperatively Managing the White-Tailed Deer

TPWD encourages the establishment of wildlife cooperatives, many of which are focused on white-tailed deer. First, by facilitating coordination among landowners engaged in wildlife management, cooperatives, for example, have made it unnecessary for landowners to build high fences to restrict wildlife movements. Before becoming a cooperative, landowners would build tall fences to retain deer herds that were precisely managed. Through cooperatives, neighboring landowners now often agree to a similar herd structure, negating the need for fences.

Secondly, cooperatives facilitate communication between agency biologists and landowners. By attending regular meetings of the cooperatives, TPWD biologists can communicate with numerous landowners at once, and vice versa. Likewise, the cooperatives often gather harvest data collectively and deliver them to biologists at one time. Of course, if the biologist needs to prescribe a revised management strategy for local wildlife, that strategy can be implemented across a broad group of landowners, increasing its chance of success.

Finally, TPWD has encouraged cooperatives as a tool to deal with habitat fragmentation. The cooperatives not only help wildlife managers implement management across fragmented ownership, but they also encourage community pride in local wildlife resources, sometimes to the point of deterring further fragmentation. One cooperative, for example, supported legislation to provide tax breaks to landowners who keep land in healthy wildlife habitats. With the cooperative's support, the legislation passed.

Refuges Try Wildlife Cooperatives

A few refuges already function within cooperatives. For example, ACE Basin National Wildlife Refuge in South Carolina is part of a successful deer management cooperative. The Grasslands Wildlife Management Area in California's San Joaquin Valley is part of the Grasslands Water District, formed by landowners who want to conserve waterfowl.

Perhaps the best example is the Butte Sink National Wildlife Refuge in California's Sacramento Valley. Although the refuge is only 770 acres, it is surrounded by dozens of waterfowl hunting clubs that formed the Butte Sink Waterfowl Association in 1986. The refuge is a member of the association, which has found collaborative solutions to such problems as water delivery systems, water quality, waterfowl disturbance, waterfowl disease control and mosquito control. Moreover, the association facilitates wildlife research projects that

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Counting Hawks above the Canopy

by Joe D'Arrigo

One morning last fall, I witnessed an amazing concentration of migrating hawks, some of them actually flying below my position on our new observation tower. South Texas Refuge Complex Park Ranger Mike Carlo, who lives on Santa Ana National Wildlife Refuge, had seen a lot of hawks landing on the refuge the night before. "Could be a huge lift-off this morning," he said. "I'm going up the tower to count how many take off. You should come."

From the top deck of Santa Ana Refuge's newest attraction – a 43-foot-tall treetop observation tower – I saw more than 10,000 broad-winged hawks rise on the morning thermals on all sides of the tower. Several flew so close that I felt I could reach out and touch them. Most were on their way to spend the winter in South America, where they would arrive in 45-50 days. After about an hour of watching this spectacle and with no end in sight, I felt sure that the tower would become a favorite staff and visitor spot for many years.

Seeing it All the Way Up

Opened to the public in December 2006, the tower has a unique design. Constructed entirely of industrial aluminum, the open-air structure lets staff and visitors see the surrounding subtropical, riparian woodland at all levels, from the ground to the top of the canopy. Wildlife observers can peer into the canopy as they ascend the 70 steps to the top. Additional design criteria allow for the future addition of an elevator to meet accessibility criteria of the Americans with Disabilities Act.

Many discussions were held among refuge managers, visitor services staff, biologists, maintenance staff and engineers to ensure that maximum safety criteria were met while providing the optimum viewing experience for birders, butterfly enthusiasts, photographers and school children. The Texas Parks and Wildlife Department provided funds for the entrance trail and the Friends of Santa Ana Refuge paid for signs, benches, a patio and landscaping of the tower base with native plants.

A new 43-foot-tall open-air observation tower on Santa Ana National Wildlife Refuge in Texas enables staff and visitors to peer into the surrounding subtropical, riparian woodland at all levels, from the ground to the top of the canopy. (USFWS)

"While the primary purpose of the tower is to aid in surveying plant and wildlife communities, we thought it might be possible to make it into a unique wildlife observation facility as well," said Project Leader Ken Merritt.

Commanding 360° View

Santa Ana Refuge Manager Jodi Stroklund explained, "The design of this tower allows a commanding 360° view of the surrounding countryside. Coupled with the height of the tower, this provides an exceptional opportunity for biologists. As Santa Ana hosts over 150,000 visitors a year, we thought sharing the uniqueness of our refuge with this tower would provide an unparalleled experience for all." Park rangers and refuge volunteers will also use the tower to teach students and visitors how different bird species use distinct layers of the forest to build nests, rest or look for food.

Although refuge biologists for years have offered a spring hawk watch at Santa Ana Refuge, the tower will now help people get a more accurate picture of the way migrating raptors utilize the refuge to roost and feed. The topography of the Lower Rio Grande Valley of south Texas is quite flat and with the tower rising 43 feet, visitors and staff can have a great vantage point to survey the variety of habitats on the refuge and, on a clear day, enjoy vistas up to 20 miles away. ◆

Joe D'Arrigo is maintenance supervisor for Santa Ana and Lower Rio Grande Valley National Wildlife Refuges.

Where the Buffalo Roam — *continued from pg 1*

and Neal Smith Refuge have the highest genetic uniqueness of all Service herds, according to Halko.

An existing herd at Neal Smith Refuge, whose genetic makeup was not quite unique, was given to the Meskwaki and Spirit Lake tribes in Iowa and North Dakota. Two bison from the original Neal Smith Refuge herd will be used by an Iowa park for public education.

"No Detectable Cattle Hybridization"

What seems like musical chairs with very large animals is more like a giant puzzle in which advances in biotechnology have made it possible to move around the puzzle pieces in increasingly intricate patterns.

There is a popular desire to talk about "purebred" bison. The more accurate term is "no detectable cattle hybridization," and "detectable" is the key word. The entire bison DNA genome has not been mapped, so there is the possibility that cattle genes are lurking in an animal or a herd.

Neal Smith Refuge needed to make room for its new herd by finding a home for its existing bison. Refuge Manager Nancy Gilbertson had long been in discussions about ways to help the Meskwaki Tribe start its own herd. This was an opportunity to give them 23 animals. The tribe has historical and cultural connections to bison which can now be revived.

Gilbertson also informed the local media that Neal Smith Refuge would be losing one bison herd and gaining another, which prompted an immediate increase in visitation – triple what it normally is during the month of December.

One visitor expressed appreciation to the refuge for replacing the herd. In a letter to the *Des Moines Register,* the visitor said she was "so happy to see the buffalo return to the Neal Smith Refuge. We make a weekly visit to the refuge. This visit is a stress reliever for both of us. We have taken grandkids there and the rest of the family."

Using Science to Manage for Diversity and Purity

Halko says genetic testing enables the Service to manage herds more closely for diversity or purity and provide more effectively for the overall fitness of the species. As the technology continues to advance, even more sophisticated testing can be completed on individual animals. Most of the genetic research has been done at Texas A&M University and the University of California at Davis.

As part of the overall management plan for bison, a pilot bison herd – 15 animals from the National Bison Range – will be moved this spring to Rocky Mountain Arsenal National Wildlife Refuge in Colorado. Bison were part of the historical landscape in the American plains where their migration and grazing habits stimulated key ecological processes on the prairie. Bringing them back will enable the refuge to study the effects of the herd on native short-grass prairie ecology.

The Service is working with its military partners to ensure that reintroduction of bison comply with regulations and policies related to the ongoing clean-up of the Arsenal and the full transformation of the site to a national wildlife refuge.

"These refuges were established in the early 1900s when President Teddy Roosevelt wanted to preserve the bison and other big game," says Halko. "Here we are 100 years later continuing that preservation on a genetic level. It's truly historic."

Has there been progress in that century of conservation?

"Absolutely," concludes Halko. "At the turn of the century bison numbers were very low in the United States, but now public herds of bison are commonplace." ◆

Wildlife Cooperatives – A New Tool for Conservation Beyond the Boundaries — *continued from pg 20*

require access and communication with multiple landowners.

Wildlife cooperatives are effective, but they only work in the right setting. Many rural refuges, where neighboring landowners manage wildlife to varying degrees, could be ripe for a cooperative. However, like Friends organizations, there must be a nucleus of community interest from the start.

Also like Friends organizations, cooperatives can help knit refuges further into the fabric of local communities and help bring about long-term conservation goals. Ducks Unlimited and the Quality Deer Management Association are interested in helping develop new cooperatives in the vicinity of refuges. Interested refuges should call Larry Williams at 703-358-2174. For more information about the Texas program and to obtain their booklet, "A Guide for Wildlife Management Association and Co-ops," call 1-800-792-1112. To download the booklet, go to http://www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_bk_w7000_0336.pdf. ◆

Larry Williams, a wildlife biologist, is Chief of the Office of Budget for the National Wildlife Refuge System. Over his career thus far, he has helped manage 10 wildlife refuges and was the Fulfilling the Promise *coordinator for the Refuge System.*

Taking Care of the Trout

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Necedah Refuge Private Lands Biologist Bill Peterson explains that in 1983, local fisheries staff developed LUNKERS - Little Underwater Neighborhood Keepers Encompassing Rheotaxic Salmonids. These small overhangs with the big name are usually constructed over deep pools and protect trout from wading birds. Private contractors and state fisheries crews installed 535 LUNKERS along Coles Creek as well as 147 log/rock weirs and a variety of ramps, silt traps and short rapids. Coles Creek is now a Class 1 trout stream with a fully self-sustaining brook trout population that requires no supplemental stocking.

Necedah Refuge also partnered with the Ho-Chunk Nation, Vernon County Land Conservation Department and the Natural Resources Conservation Service to restore part of Billings Creek on Ho-Chunk land about 35 miles southwest of the refuge. A variety of fish habitat structures was installed and eroding streambanks were shaped and stabilized. Two drainage ditches were plugged, restoring six acres of floodplain wetland. Peterson says the Billings Creek trout population is expected to increase with bald eagles feeding on spawning trout in the fall. Sandhill cranes should also benefit from this wetland restoration.

Necedah National Wildlife Refuge in Wisconsin partnered with the Ho-Chunk Nation to restore part of Billings Creek on Ho-Chunk land in the Driftless Area. The photo on the left shows the creek before restoration; the photo on the right shows the post-restoration creek, ready to host a growing trout population. (USFWS)

Habitat Restoration in Whittlesey Creek

Way up on the northern tip of Wisconsin, restoration of the coaster brook trout native to Lake Superior is one of the goals of Whittlesey Creek National Wildlife Refuge. The refuge itself is primarily working on habitat restoration, according to Refuge Manager Pam Dryer – replacing culverts for fish passage, acquiring easements to protect groundwater flow and reducing sediment flowing into streams.

Henry Quinlan, fisheries biologist at the Ashland Fisheries Resource Office, leads a project that is stocking two strains of brook trout eggs, fry, and yearlings in Whittlesey Creek. Biologists want to see if either or both strains will move into Lake Superior and return to the creek to spawn. Quinlan says the first trout could return to the creek this fall. Geneticists with USGS analyze tissue samples to determine whether fish that were too small to mark with a fin clip or tag when they were stocked are the result of the stocking project.

"The ultimate goal," says Quinlan, "is too have fish return, spawn and survive and then repeat the cycle." State regulations currently allow the coaster brook trout to be caught and released in the creek, and there is a 20-inch minimum on brook trout caught in Lake Superior.

"It would be special if we could restore to the refuge a fish that has such lore, a legacy in Lake Superior," says Quinlan, "because there is long-term stewardship of the river system when it's part of the refuge." ◆

Chief's Corner

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They've already taken action. One of the Caucus' first acts was to introduce the Refuge Ecology Protection, Assistance, and Immediate Response (REPAIR) Act, which promotes greater cooperation among federal, state and private interests to control non-native species. REPAIR would make permanent the Cooperative Voluntary Invasive Species Monitoring and Control Program, which has for the past three years enabled hundreds of Refuge Friends organizations to detect invading plants and control established invasives.

The Congressional Caucus is focusing on future budgets for the Refuge System. Members of Refuge Friends organizations and others interested in the Refuge System can see if their House members are also members of the Congressional Wildlife Refuge Caucus by going to http://refugenet.e-actionmax.com/showalert.asp?aaid=2110.

Caucus member and their staffers got their first full introduction to the Refuge System on March 9 when Deputy Refuge Chief Jim Kurth and I took about 40 minutes to present what we called "Refuges 101." We gave them highlights about the Refuge System, its history, the National Wildlife Refuge System Improvement Act, our successes and our challenges.

Most importantly, we told them that national wildlife refuges are cornerstones in their communities, places that give communities a sense of themselves. I could see heads nodding in agreement across the room.

A New Land Bridge Forms Naturally on Cape Cod

by Michael Brady and Monica Williams

You can now walk from Chatham Lighthouse to Monomoy Lighthouse on Cape Cod in Massachusetts without getting your feet wet, an impossible task for almost half a century. So can the predators of migratory birds. That poses new challenges for Monomoy National Wildlife Refuge staff, who have worked for more than a decade on an Avian Diversity Program to assure protection of such endangered and threatened species as piping plover, common terns and roseate terns.

Monomoy National Wildlife Refuge, established in 1944 to provide habitat for migratory birds, was once on Monomoy Peninsula. But the peninsula broke off from the mainland in 1958; the resulting island split again during the blizzard of 1978. A landmass called South Beach formed off the refuge in the north and began creeping slowly southward. Wind, water and weather finally caused the southern end of South Beach to attach itself to the northeast tip of South Monomoy Island on Thanksgiving Day 2006.

Before the natural bridge was built, only the eastern coyote was strong enough to swim across to the refuge. Now, the birds no longer have the watery barrier that has kept other predators -- skunk, weasel, opossum and raccoon – off South Monomoy since the 1960s.

Wind, water and weather finally caused the southern end of South Beach to attach itself to the northeast tip of South Monomoy Island at Monomoy National Wildlife Refuge in Massachusetts. The new land bridge has created a host of challenges for the migratory birds that are the refuge's wildlife focus. (USFWS)

The refuge has been forced to gear up for a mammalian predator invasion that could wipe out the colony of 10,000 pairs of common terns the Avian Diversity Program has built up from a colony of just 300 pairs in 1996. Monomoy Refuge hosts the largest common tern colony on the Atlantic Seaboard. About 20 pairs of federally-endangered roseate terns also nest at Monomoy.

Mammalian Predator Control

The refuge will have to use such predator control techniques as box traps to control mature predators and decrease the

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